Claims

1. A rotary compressor comprising:

a driving shaft being rotatable clockwise and counterclockwise, and having an eccentric portion of a predetermined size;

a cylinder forming a predetermined inner volume;

a roller installed rotatably on an outer circumference of the eccentric portion so as to contact an inner circumference of the cylinder, performing a rolling motion along the inner circumference and forming a fluid chamber to suck and compress fluid along with the inner circumference;

a vane installed elastically in the cylinder to contact the roller continuously;

a first bearing installed in the cylinder, for supporting the driving shaft rotatably;

a second bearing for rotatably supporting the driving shaft and preliminarily storing the fluid to be sucked;

discharge ports communicating with the fluid chamber; and

a valve assembly having openings separated by a predetermined angle from each other, for allowing the openings to selectively communicate with the second bearing at a predetermined position of the fluid chamber according to rotation direction of the driving shaft,

wherein compression spaces that have different volumes from each other are formed in the fluid chamber according to the rotation direction of the driving shaft so that two different compression capacities are formed.

2. The rotary compressor of claim 1, wherein the roller compresses the fluid using the overall fluid chamber only when the driving shaft rotates in any one of the clockwise direction and the counterclockwise direction.

3. The rotary compressor of claim 1, wherein the roller compresses the fluid using a portion of the fluid chamber when the driving shaft rotates in the other of the clockwise direction and the counterclockwise direction.

4. The rotary compressor of claim 1, wherein the discharge ports comprise a first discharge port and a second discharge port which are positioned facing each other with respect to the vane.

5. The rotary compressor of claim 1, wherein the valve assembly comprises:

a first valve installed rotatably between the cylinder and the bearing; and

a second valve for guiding a rotary motion of the first valve.

6. The rotary compressor of claim 5, wherein the first valve comprises a disk member contacting the eccentric portion of the driving shaft and rotating in the rotation direction of the driving shaft.

7. The rotary compressor of claim 6, wherein the first valve has a diameter larger than an inner diameter of the cylinder.

8. The rotary compressor of claim 6, wherein the first valve is 0.5 – 5 mm thick.

9. The rotary compressor of claim 5, wherein the first valve comprises:

a first opening communicating with the second bearing when the driving shaft rotates in any one of the clockwise direction and the counterclockwise direction ; and

a second opening communicating with the second bearing when the driving shaft rotates in the other of the clockwise direction and the counterclockwise direction.

10. The rotary compressor of claim 9, wherein the first opening is positioned in the vicinity of the vane when the driving shaft rotates in any one of the clockwise direction and the counterclockwise direction.

11. The rotary compressor of claim 9, wherein the second opening is

positioned separated from the vane by a predetermined angle when the driving shaft rotates in the other of the clockwise direction and the counterclockwise direction.

12. The rotary compressor of claim 10, wherein the first opening is positioned spaced by approximately 10° from the vane clockwise or counterclockwise.

13. The rotary compressor of claim 11, wherein the second opening is positioned in a range of 90 - 180° from the vane to face the first opening.

14. The rotary compressor of claim 9, wherein the first opening and the second opening are circular or polygonal.

15. The rotary compressor of claim 9, wherein the first opening and the second opening are cut-away portions.

16. The rotary compressor of claim 9, wherein the first opening and the second opening are rectangles each having a predetermined curvature.

17. The rotary compressor of claim 14, wherein the first opening and the second opening have diameters ranged from 6 mm to 15 mm.

18. The rotary compressor of claim 9, wherein the first opening and the second opening are positioned in the vicinity of the outer circumference of the first valve.

19. The rotary compressor of claim 5, wherein the first valve comprises a penetration hole into which the driving shaft is inserted.

20. The rotary compressor of claim 5, wherein the second valve is fixed between the cylinder and the bearing and comprises a site portion for receiving the first valve.

21. The rotary compressor of claim 20, wherein the second valve has the same thickness as the first valve.

22. The rotary compressor of claim 9, wherein the first valve further comprises a third opening communicating with the second bearing concurrently with the second opening when the driving shaft rotates in the other of the clockwise direction and the counterclockwise direction.

23. The rotary compressor of claim 22, wherein the third opening is positioned between the second opening and the vane.

24. The rotary compressor of claim 23, wherein the third opening is positioned spaced by approximately 10° from the vane clockwise or counterclockwise.

25. The rotary compressor of claim 5, wherein the valve assembly further comprises control means for controlling a rotation angle of the first valve such that the openings are positioned at selected locations according to rotation directions.

26. The rotary compressor of claim 25, wherein the control means comprises:

a curved groove formed at the first valve and having a predetermined length; and

a stopper formed on the bearing and inserted into the curved groove.

27. The rotary compressor of claim 26, wherein the curved groove is positioned in the vicinity of a center of the first valve.

28. The rotary compressor of claim 26, wherein the stopper has the same thickness as the first valve.

29. The rotary compressor of claim 26, wherein the stopper has the same width as the curved groove.

30. The rotary compressor of claim 26, wherein the curved groove has an angle of 30 - 120° between both ends thereof.

31. The rotary compressor of claim 25, wherein the control means comprises:

a projection formed on the first valve and projecting in a radial direction of the first valve; and

a groove formed on the second valve, for receiving the projection movably.

32. The rotary compressor of claim 25, wherein the control means comprises:

a projection formed on the second valve and projecting in a radial direction of the second valve; and

a groove formed on the first valve, for receiving the projection movably.

33. The rotary compressor of claim 25, wherein the control means comprises:

a projection formed on the second valve and projecting toward a center of the second valve; and

a cut-away portion formed on the first valve, for receiving the projection movably.

34. The rotary compressor of claim 33, wherein the projection and the cut-away portion form a gap therebetween and the gap communicates with the second bearing according to the rotation direction of the driving shaft.

35. The rotary compressor of claim 33, wherein the projection has an angle of 10 - 90° between both side surfaces.

36. The rotary compressor of claim 33, wherein the cut-away portion has an angle of 30 - 120° between both ends thereof.

37. The rotary compressor of claim 1, wherein the second bearing comprises:

a body defining a predetermined inner space; and

a sleeve for receiving the driving shaft rotatably.

38. The rotary compressor of claim 37, wherein the second bearing has a single opening that is formed on an upper portion of the body and communicates with the openings of the valve assembly.

39. The rotary compressor of claim 37, wherein the inner space has 100 - 400 % a volume as large as the fluid chamber.

40. The rotary compressor of claim 1, wherein the second bearing accommodates oil extracted from the stored fluid.

41. The rotary compressor of claim 37, wherein the second bearing further comprises a support portion configured to support the valve assembly.

42. The rotary compressor of claim 41, wherein the support portion is comprised of an end of the sleeve configured to support the valve assembly.

43. The rotary compressor of claim 41, wherein the support portion is at least one boss that comprises a connection hole for supporting the valve assembly and coupling the second bearing with the cylinder.

44. The rotary compressor of claim 43, wherein the bosses are formed on a wall of the body.

45. The rotary compressor of claim 37, wherein the second bearing further comprises a suction inlet to which a suction pipe to supply the fluid is connected.

46. The rotary compressor of claim 45, wherein the suction inlet is positioned in the vicinity of the vane.

47. The rotary compressor of claim 45, wherein the suction pipe has a coupling (joint) configured to firmly fix the suction pipe to the suction inlet around the suction pipe.

48. The rotary compressor of claim 37, wherein the second bearing further comprises a closing unit configured to selectively close the openings according to the rotation direction of the driving shaft.

49. The rotary compressor of claim 48, wherein the closing unit selectively closes a second opening of a first valve of the valve assembly.

50. The rotary compressor of claim 48, wherein the closing unit is a rib extending between the body and the sleeve.